



## Case Report

# Surgical Treatment of a Perinephric Pseudocyst in a Five-Month-Old Female Cat

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### ABSTRACT

**Introduction:** A perinephric pseudocyst is characterized by the accumulation of fluid within fibrous sacs surrounding one or both kidneys, typically located in the subcapsular or extracapsular areas. Histologically, these cysts lack an epithelial lining, thus earning the term "pseudocyst." This condition is uncommon in cats and is often associated with chronic kidney disease, particularly in older animals. Diagnosis relies heavily on imaging modalities, and prognosis varies based on the severity of renal impairment. This case report aims to detail the diagnosis and treatment of a rare perinephric pseudocyst in a 5-month-old female domestic short-haired cat.

**Case report:** A left perinephric pseudocyst was diagnosed in a 5-month-old female domestic short-haired cat weighing 4.7 kg, presented to Guilani Pet Hospital, Guilani, Iran in January 2021 with a history of abdominal distension and anorexia. Physical examination revealed distension on the left side of the abdomen without any other significant findings. Complete blood count was within normal limits, while the biochemical profile showed elevated blood urea nitrogen (BUN) and serum creatinine (sCr) levels at the upper limits of the reference range, along with elevated glucose and alkaline phosphatase (ALP) levels above the reference range. Plain radiography revealed a large mass on the left side of the abdomen, and ultrasonography confirmed the presence of anechoic fluid surrounding the left kidney. Subsequently, a unilateral nephrectomy was performed. Following surgery, the cat owner reported satisfaction with the outcome, and the cat showed no signs of illness during follow-up examinations over the next six months. Both complete blood count and biochemical profiles remained within normal ranges.

**Conclusion:** While perinephric pseudocyst is rare in young cats, it should be considered in cases of abdominal distension and renomegaly. Utilizing imaging is crucial for diagnosis, and nephrectomy proves to be a reliable treatment, ensuring both owner satisfaction and positive results.

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## 1. Introduction

A perinephric pseudocyst is an uncommon condition in cats characterized by the accumulation of fluid within fibrous sacs surrounding one or both kidneys, often located in the subcapsular or extracapsular regions<sup>1</sup>. This condition typically manifests in older cats and is less frequently observed in kittens<sup>2</sup>. There is no reported breed predisposition, although male cats appear to be more commonly affected<sup>3</sup>. The etiology of perinephric pseudocysts involves several factors, including the

accumulation of transudate due to elevated hydrostatic pressure, lymphatic blockage, or rupture of renal cysts<sup>4</sup>. These cystic lesions, which consist of encapsulated fluid collections adjacent to the kidney, can result from various causes such as trauma, infection, or congenital anomalies<sup>5</sup>. Furthermore, the accumulation of urine may occur due to the rupture of the renal pelvis or ureter, congenital urinary tract anomalies, or obstructive processes<sup>6</sup>. Hemorrhagic fluid buildup may also contribute, influenced by factors like

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coagulation disorders or vascular incidents<sup>7</sup>. Their clinical manifestations are often nonspecific, ranging from asymptomatic incidental findings to symptomatic presentations such as abdominal pain, palpable masses, and urinary tract obstruction<sup>2</sup>. However, perinephric pseudocysts are idiopathic in origin but are frequently associated with underlying chronic kidney disease (CKD). Clinical presentation includes polyuria, polydipsia, anorexia, and weight loss (related to underlying CKD), but the owner typically notices only abdominal distension as the primary abnormality<sup>4</sup>. Histologically, it is characterized by the absence of an epithelial lining in the cyst wall, which is why it is termed a "pseudocyst."<sup>8</sup>

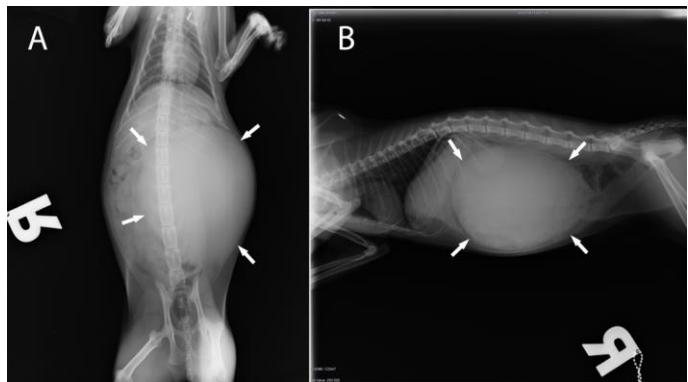
The provisional diagnosis of perinephric pseudocysts is typically established through imaging studies, particularly abdominal ultrasonography, which reveals the presence of anechoic fluid located between the renal capsule and the parenchyma<sup>9</sup>. The surgical management of perinephric pseudocysts involves careful consideration of factors such as the lesion's location, size, and its relationship to surrounding anatomical structures. Treatment options include percutaneous cyst drainage or capsulectomy, either performed independently or in conjunction with nephrectomy<sup>10</sup>.

Management options for perinephric pseudocysts vary depending on the clinical presentation, size, and underlying pathology. While conservative measures, such as observation and antibiotic therapy, may suffice for small, asymptomatic lesions, surgical intervention becomes imperative in cases of symptomatic or complicated pseudocysts<sup>11</sup>. Postoperative management undergoing surgical treatment for perinephric pseudocysts involves close monitoring for complications, such as hemorrhage, infection, and renal impairment<sup>3</sup>. The current case report aimed to describe the diagnosis and treatment of a rare perinephric pseudocyst in a 5-month-old female domestic short-hair cat.

## 2. Case report

A 5-month-old female domestic short-haired cat weighing 4.7 kg was presented to Guilan Pet Hospital, Guilan, Iran in January 2021 with a history of progressively distended abdominal region over 3 weeks, with rapid growth noted in the last 3 days. Physical examination revealed marked abdominal distension, asymmetrical with greater prominence on the left side, and no other significant abnormalities were noted. Peripheral blood was collected for hematological and biochemical evaluations. The complete blood count (CBC) was within the reference range. The biochemical profile indicated elevated blood urea nitrogen (BUN) and serum creatinine (sCr) levels at the upper limit of the reference interval, while glucose and alkaline phosphatase (ALP) were above the reference range (150 mg/dl and 159 IU/l, respectively).

Abdominal radiographs were obtained in ventro-dorsal (VD) and lateral views, revealing a large mass measuring 11\*13 cm located on the left side of the abdomen in the kidney area (Figure 1A, B). Subsequent abdominal

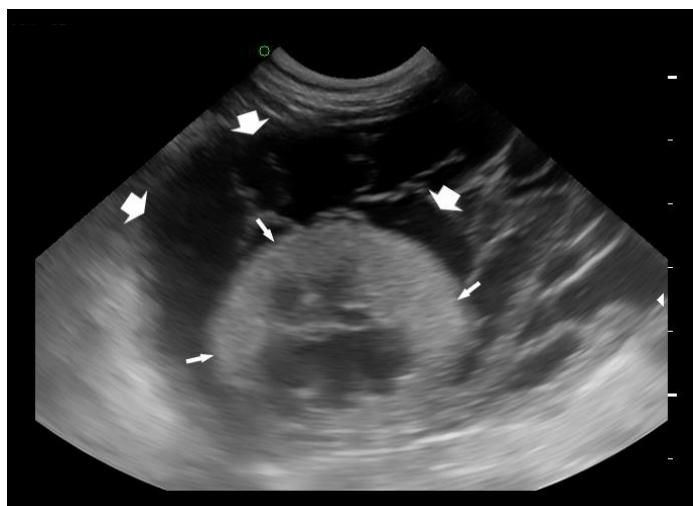


**Figure 1.** Ventrodorsal (VD) view of the 5 5-month-old female domestic short-hair cat radiograph shows the distended lesion (arrows) (A). Lateral view (B)

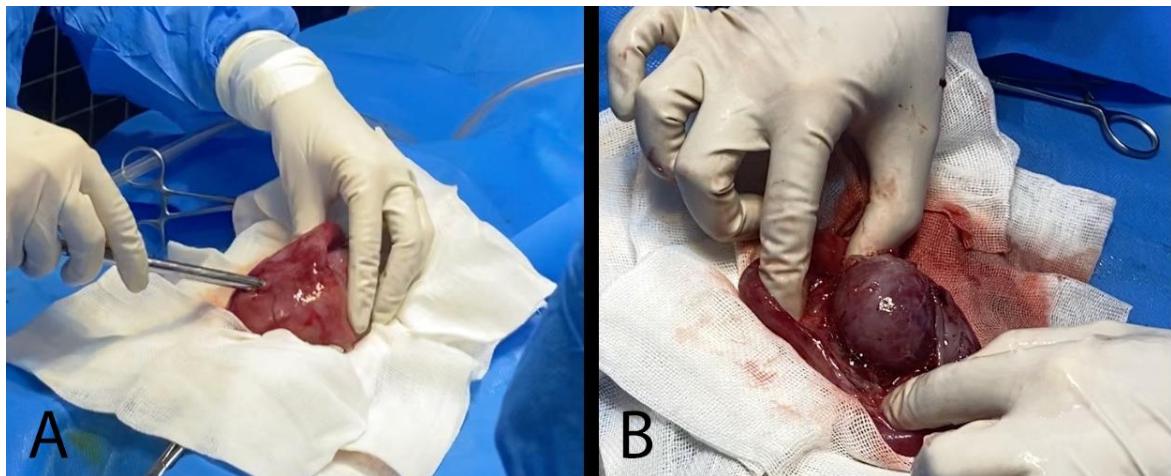
ultrasonography confirmed the presence of anechoic fluid surrounding the left kidney (Figure 2).

### 2.1. Treatment and outcome

The cat was referred to the surgery department for surgical treatment. A left unilateral nephrectomy was performed<sup>12</sup>. The surgical procedure began with overnight fasting, followed by induction using Propofol (6 mg/kg IV, Dongkook Pharm, South Korea) for induction<sup>13</sup>. The cat was intubated and isoflurane (MAC=1.5%, Piramal Critical Care, USA) was used for maintenance of general anesthesia<sup>13</sup>. After making an incision through linea alba and providing access to the abdominal cavity, the peritoneum over the left kidney was incised. Fluid within the pseudocyst was removed with the aid of a scalpel vein set and suctioned through a stab incision (Figure 3A, B). The kidney was elevated and the renal vein and all branches of the renal artery were ligated. The left ureter was ligated near the bladder then the kidney and the ureter were removed. To prevent infection, Cefazolin (22 mg/kg IM, Loghman, Iran) was administered postoperatively for a day<sup>12</sup>. Additionally, a single dose of Tramadol (2 mg/kg SC,



**Figure 2.** Abdominal ultrasonography of the 5 months-old female domestic short-hair cat. Left Kidney. The kidney (small arrows) were surrounded by a large amount of anechoic fluid(large arrows)



**Figure 3.** Removing fluid inside the pseudocyst (A). Left kidney surrounded by the pseudocyst (B)

Darou Pakhsh, Iran) was injected to reduce post-operative pain<sup>13</sup>.

In order to evaluate the preserved kidney function and animal general health, postoperative monthly checkups were done for 6 months. The client was satisfied with the result with no history of illness. In physical examination, no abnormality was found. Complete blood count and biochemistry profile were normal. Serum Creatinine (sCr) was 0.8-1.7 mg/dl, blood urea nitrogen (BUN) and electrolytes were within reference range<sup>14</sup>. Abdominal ultrasonography revealed enlargement in the right kidney (from 4.04 cm to 4.8 cm) with acceptable parenchyma and urinary bladder with normal wall thickness.

### 3. Discussion

Reports indicate that perinephric pseudocysts predominantly affect older animals, typically those older than 8 years old<sup>15</sup>. In a retrospective study involving 26 cats with this condition, 73% were male, with ages ranging from 4 to 18 years and a mean age of 11 years. The primary clinical sign observed was abdominal distension, and most of the animals exhibited some degree of renal dysfunction.<sup>16</sup> In another study with 13 cats, the mean age was 16 years old<sup>2</sup>. In the current case report, the patient was young and female, but presented with similar clinical signs. Furthermore, the absence of ureterolithiasis or a history of trauma in this young animal suggests a congenital origin for the disease.

Renal function loss and azotemia may result from the pseudocyst compressing the renal parenchyma or from associated interstitial fibrosis<sup>17</sup>. Approximately, 90% of cats exhibit some level of renal disease at the time of diagnosis<sup>18</sup>. In this case, the patient's serum creatinine was within the reference range established by the International Renal Interest Society (up to 1.6 mg/dl)<sup>14</sup>. The clinical and imaging findings of this case were compatible with a perinephric pseudocyst, which was confirmed by histopathological examination. Treatment options included percutaneous cyst drainage or capsulectomy, which can be performed either alone or in combination with nephrectomy.

### 4. Conclusion

Perinephric pseudocyst is not commonly reported in cats of pediatric age but should be considered as a differential diagnosis of patients presenting with abdominal distension and renomegaly, even when young. The importance of imaging studies should be considered due to their assistance in differential diagnosis. Nephrectomy can be considered a reliable treatment option for these patients, both due to the owner's satisfaction and the positive outcome.

#### Declarations

##### *Competing interests*

Authors have no competing interests.

##### *Authors' contributions*

Soudabe Moradi performed the surgery and was involved in post-operative care. Mahbod Bazhban and Mojtaba Jafari Taheri collected the data and wrote the draft of the manuscript. Mohammad Mojtabahedzadeh performed the analysis and diagnosed the disease. All authors confirmed the final version of the manuscript for publication in the present journal.

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##### *Availability of data and materials*

Due to privacy concerns of the corresponding author, the data is not openly available.

##### *Ethical Considerations*

All authors have checked the ethical concerns such as plagiarism, misconduct, fabricated or false data, consent to publish double publication and/or submission, and

redundancy.

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